What's Working:

Vegetation Establishment & Maintenance

July 2016

Wetland Establishment

2016 Information

- The first question to consider is if the site is suitable for wild rice. All of Minnesota is within the historic wild rice range, but not all sites are suitable for wild rice. Rice grows best in water depths ranging from ½ to 3 feet, though 1 ½ feet is considered ideal. Sites with flowing water, such as basins with inlets and outlets, are generally more productive than sites without surface flow. Basins without surface flow should have significant ground water movement. A soft muck bottom is ideal, but rice can grow well in other soft substrates including sand. Water chemistry should be fresh rather than saline.

  If the particular site used to have wild rice, but doesn't any longer, there is likely a habitat problem. That problem needs to be identified and fixed before planting. If the habitat conditions aren't right, seeding rice will just be a waste of time and money. Once the habitat issue is resolved, wild rice will often come back on its own, as the seeds can remain viable in the substrate for decades, and seeding may not even be needed. The most likely suspect in these cases is excessive water levels.

  Many folks think that wild rice seeds, like other food plants, should be planted in the spring. However, the best time to plant wild rice is in the fall. For germination to occur, wild rice seeds need to be kept wet and exposed to freezing conditions for 3-4 months. So the best planting method mimics the natural process: the seed should be harvested when ripe, in August or September during the ricing season, and then planted within a day or two in the selected basin. The grains can be simply tossed into the water by hand. Mixing the seeds with sediment to form "mud balls" is not necessary. Fully ripe seeds will sink to the bottom on their own. If wild rice will not be planted right away after harvest, the seeds will need to be kept wet; if they dry out, they won't sprout. Placing the rice in a burlap sack or mesh bag and submerging in a tub of water is a common method to keep seeds viable. Seeding can be delayed until spring, but only if the grain is kept wet and exposed to near-freezing temperatures until planted.

  Finding a source of seed geographically close to the planting site is the best approach for a couple of reasons. There are three taxa of wild rice documented in Minnesota: Zizania palustris var. palustris, Zizania palustris var. interior, and Zizania aquatica var. aquatica. The Zizania palustris varieties (northern wild rice) are found throughout most of the state, while Zizania aquatica (southern wild rice) is limited to southeast Minnesota. If you are trying to restore wild rice to a basin, using a local seed source will increase the odds that you are restoring the taxa of wild rice that was native to that site. A second reason is that the more local a source, the increased chance of success. For instance, rice seed from Becker County will likely grow better in Otter Tail County than rice seed from St. Louis County. However, getting

seed from a nearby source is not always feasible. But the maximum distance allowed from the site to the seed source, per the DNR planting permit, is 200 miles.

Distance is not the only factor to consider. Long-time ricers see distinct differences between lake and river rice. If planting a lake site, stick with a lake-source seed, and make the same consideration for rivers.

One way to obtain seed is to harvest it yourself during the ricing season. DNR staff can harvest seed for DNR planting projects through the authority granted to the DNR Commissioner in MN Statute 84.15 Subd. 2. Citizens or non-DNR staff interested in harvesting their own seed will need to purchase a ricing license. Another option for getting seed is to purchase it from a wild rice harvester, though it is usually necessary to contact the ricer well in advance of the ricing season to discuss the quantity, source, and price.

The recommended seeding rate is 50 lbs. per acre. Seeding for three years should insure a self-sustaining seed bank. A feasible approach is to seed small areas of the basin and monitor the results. If the rice grows well, then seeding efforts can be expanded. (MN DNR, Management Minute)

2013-2014 Information

- Last fall we excavated a small wetland down to clay for a Waseca County landowner. It was part of a larger prairie restoration but we put six inches of black soil back over the clay and seeded the wetland with a separate wet emergent mix with arrowhead, mud plantain and several Scirpus. The seed was Rice County origin, closest available. I looked at the site with the landowner a later in the summer and was surprised to see a large amount of soft stem bulrush along with other emergents. We must have lucked out and captured a lot of softstem bulrush seed from the native seedbank that must be many decades old. The basin is free of RCG for now because we scraped it off initially (Hugh Valiant).

- Some conditions are too unfavorable for seeding. Dense areas of reed canary grass and cattails may be too difficult to control to allow for seeding, unless their extensive root systems can be scraped away and removed (to somewhere deep and dark, or high and dry). Some sites may also have high nutrient conditions, extreme water fluctuations, or invasive species waiting to move in that also make them poor candidates for wetland seeding (Dan Shaw, BWSR).

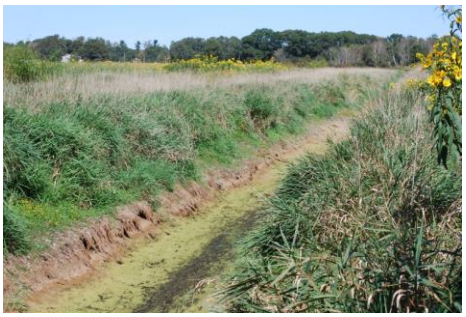
- Native Seedbank is still the first priority for establishing most wetlands. Releasing the native seedbank through scraping or herbicide application is still the first preference for projects, if a viable seedbank likely exists. This is hard to judge, and may take some time to understand the results, and whether supplemental seeding would help (Dan Shaw, BWSR).

- Thorough site preparation is needed prior to wetland seeding**.** We all seem to rush site preparation for one reason or another

(grant periods, the need for wetland credit, impatience), but this usually leads to trouble down the road. Time is needed to ensure that previously applied agricultural chemicals are not having unintended consequences, and that reed canary grass and other species will not overtake wetland seedlings (sometimes annuals such as smartweeds, barnyard grass, or bidens may need to settle down for a year before the seeding can be successful)(Dan Shaw, BWSR).

- Seed biology is an important consideration for seeding wetlands. Wetland seed comes in all shapes and sizes (most are very small), some float (tussock sedge, bur-reed, arrowhead, swamp milkweed, plantain), some sink (Torrey's rush, woolgrass) and some float and then sink (sweet flag, bulrushes, spikerushes, rice cut grass, manna grass). Some germinate the first year (wetland grasses, smartweeds, bidens, bugleweed, mountain mint, Culver's root), some the second (most sedges rushes and forbs), and some with thick seed coats, further down the road (wild iris, bur-reed) (Dan Shaw, BWSR)

- Elevation is important for considering wetland seed placement. Having the right hydrology conditions is essential for the success of wetland species. Contours should be used for planning seed zones. Wetland seeps and drainageways should also be considered.



- Wetland seeding must be timed with construction**.** Biologists and engineers don't always speak the same language, but it is important that the construction to restore hydrology and seed installation is coordinated. In many cases construction occurs in fall when water levels are lower. Wetland seeding is conducted in late fall (but spring can work too) when the ground is still firm and winter conditions naturally help break the seed coat of sedges, rushes and forbs. Grasses don't always maintain a high germination rate over winter (especially with hungry rodents and birds), but it is often too difficult (wet) to seed them in spring (Dan Shaw, BWSR)

- Stabilization of upland soils is important prior to seeding wetlands. As little as 0.5 cm of sediment can keep most wetland seeds from germinating. Mulching wetlands doesn't tend to work well, as the mulch can all end up in the same place (along the shore) if water levels rise. Instead it works well to plant a cover crop of oats that is clipped and possibly sprayed before planting wetland seed in early summer, or just clipped in late fall to minimize the biomass before seeding. In some cases, hilly uplands can be seeded in early summer to stabilize sites, followed by fall seeding of wetlands (Dan Shaw, BWSR)

- Equipment matters for seeding wetlands. Most wetland seed is broadcast with Vicon type seeders with an agitator to keep the seed blended. Brillion type seeders have been used in some cases and can work well

over oat stubble. Native seed drills need careful calibration, so they are generally avoided unless the operators is confident of his or her skills (Dan Shaw, BWSR).

- Better success comes from frequent and long-term monitoring and management. Similar to our avoidance of site preparation, project monitoring and maintenance is often ignored for a variety of reasons (lack of time, cost, not wanting to see what is really happening) but the most successful projects have frequent site visits, often with backpack sprayers to kill reed canary grass patches before they cause any more trouble. It is also through these visits over time that we learn the most about what is, and is not working for seeding wetlands (and have the opportunity to observe the diversity of plant and animal life that benefit from restored wetlands).

- The results of state wet meadow seed mixes can vary significantly depending on season of planting, soil type, moisture levels and area of the state. Wetter sites tend to have a higher percentage of sedges and bulrushes, while drier sites tend to be more dominated with grasses and forbs (Dan Shaw, BWSR).

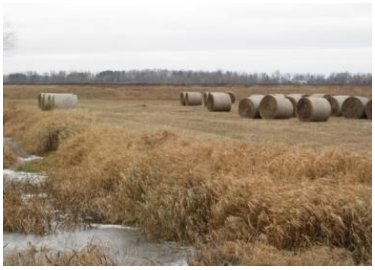
- A combination of methods can be effective at cottonwood control including foliar application, basal treatment, cut/treat, prescribed fire (while still under .5in stems and sufficient fuel and in some cases late summer mowing. The best option will depend on timing, size of plants, and available fuel for burning (Dan Shaw, BWSR).

- Sites with high water fluctuations can create big challenges for seeding wet meadow seed mixes. We have had the most success with waiting until early summer after water levels have stabilized, watching the weather for favorable seeding conditions and rolling seed after planting to improve soil contact (Dan Shaw, BWSR).

- Early season transplanting of submergent vegetation (stem fragments can work for some species) emergent plants such as river bulrush and lake sedge can lead to rapid expansion in summer in moist soils (Dan Shaw, BWSR).

- Using a cover crop on erodible uplands can prevent burying of expensive wetland seed. We have had success with both oats and wheat (oats is preferred) either mowing the oats or spraying them if they have only been growing for several weeks. A no-till or Brillion seeder can then be used for installing seed (Dan Shaw, BWSR).

- Scraping of reed canary grass can be effective if rhizomes are sufficiently buried (usually around 10-inches deep) and rhizomes are not mixed near the surface during the process. Multiple projects around the state have been successful with this process
(Dan Shaw, BWSR).



- Haying can be used to reduce the competitive advantage of reed canary grass by removing excess nitrogen from the wetland. In some cases, haying or a combination of haying and herbicide application are used to manage reed canary grass prior to prolonged inundation. For inundation to be successful water generally needs to continually submerge plants for a full growing season. (Dan Shaw, BWSR).